

Astronomy Delight!

by Ed and Susan Forrest

"Astronomical"

A special note to our readers:

Apollo 11 Astronaut Neil Armstrong died on August 25th 2012. The national day of remembrance is scheduled for September 13th. Since this is past the submission deadline for our monthly column, out of respect for this American hero we will be remembering him in November's column rather than this month. In the meantime...

As we approach Election Day I thought it would be beneficial to all the loyal readers of my column, (along with our incumbent politicians and those striving for elected office) to once again ponder the size of large numbers such as a trillions. What better way than to reprint one of my reader's favorite columns, and one that some people have informed me has appeared on the walls of barber shops, grocery stores, diners, and even coffee establishments. Now that our national debt has exceeded 16 TRILLION DOLLARS, maybe it will help us comprehend the scope of the universe after all. I hope you enjoy this encore reprint prior to your entering the voting booth.

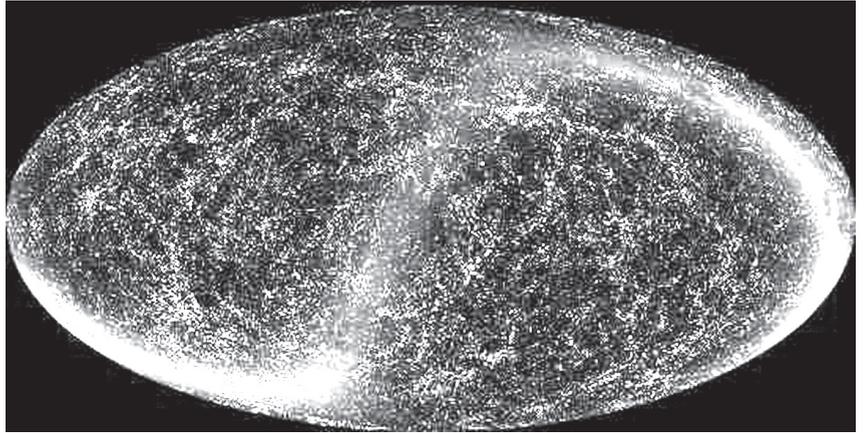
I fondly remember when I first caught the astronomy "bug" when I was child. I was amazed by the variety of objects such as planets, moons, stars, galaxies, nebulas, comets and the like that the universe contained. But the most amazing thing that I learned as I embarked on my lifelong journey of wonder was how incredibly vast the universe really is, and how distant the objects that I was to observe throughout the years were from our earth. The distances are truly "astronomical". For example.

Most people know that the moon (the big bright object in the night sky if you are not sure) is our closest celestial neighbor. Its average distance from

the earth is about 240,000 miles. A distance that, if reflected on a cars odometer, would easily give the owner anxiety as in many instances 240,000 miles on a car would be considered the cars last legs. An easy number for any car owner to relate to. However, our sun (the big bright object in the sky during the day) being the nearest star to our earth, is an incredible 93,000,000 miles away.

Believe it or not, NOBODY who possesses any degree of intelligence can comprehend that distance. No one, (astronomers, teachers, scientists, accountants, even Einstein) who was once asked can logically discern, assimilate, absorb, or grasp, ANY number over about one million! Even if you pretend to stack football fields together, miles on a flat highway, or resort to such props as we use in our Astronomy Delight! programs of books of a million printed dots to see what a million looks like, the human brain cannot adequately understand, much less conceive of such a number. After about a million, most human brains have to resort to thinking in the abstract and the theoretical to even begin to ponder, much less logically process, such a large

The Near Infrared Local Universe.



number. But there are a few, rare, exceptions among the more "brilliant" of our human species.

Politicians, those egotistical fools found in virtually every level of government from local, state, to federal, no longer use such insubstantial numbers as hundreds, thousands, or even hundreds of thousands when it comes to dollars. They are so incredibly intelligent that a word such as a "million" does not even give them pause when they begin to pontificate their ideas to the rest of us "dumb" folks as to how to either better our society, or, perhaps further their own agendas. Multiple millions, hundreds of millions, billions, hundreds of billions, and now even TRILLIONS and multiple TRILLIONS seem to be the only vocabulary such geniuses believe they, and only they, understand. Fortunately, those of us who are astronomy enthusiasts can easily help these political intellectual wonders put their "astronomical" numbers in perspective for the poor folks they represent, even if we as astronomers cannot comprehend, or conceive of a number like a million ourselves. Are ya ready? Here we go!

There are approximately 70 sextillion stars in the universe. **70,000,000,000,000,000,000,000**

The thickness of a US dollar bill measures .0043 inches. The height of a stack of 1000 dollar bills measures 4.3 inches. A stack of 1,000,000 dollars would measure 358 feet! Wow! That's even less than my school district budget! How about a stack of 100,000,000 dollar bills? That's "only" 35,851 feet or about 6.79 miles high. About the same height that a private jet flies carrying an auto executive or a house speaker to a meeting! A billion dollar bills would stack to a height of 358,510 feet or "only" 67.9 miles. Think that's "astronomical"? No way! We have just begun! A HUNDRED BILLION dollar bills (more familiar territory for a politician if he multiplies it by about a factor of 8 or 9) would stack to a height of 6,786.6 MILES, or about 28 times higher than the orbiting space station. Finally, since most elected officials in today's world seem to be talking a trillion dollars here, and a trillion dollars there, let's really see something "astronomical".

A TRILLION dollar bills, stacked one on top of the other, would reach a

The human brain cannot adequately understand, much less conceive of such a number.

height of 67,866 miles! That's over one fourth the way to the moon! Can you imagine? I can't. I can see it, but it makes absolutely no sense to me. Maybe, if I thought of working 40 hours a week for a year and made \$480,769,231 per hour I could relate to it. Or if I spent \$20 per second for 1,585 years it would better allow me to comprehend how much a trillion dollars is.

In either case, there are approximately 70 sextillion stars in the universe. That's the number 7 followed by 22 zeros. To me that's truly "astronomical". I don't need

to understand it, see it, or even believe that many stars exist. I only need to appreciate the fact that when I see or hear the word "astronomical" applied to either stars or money, I know I am not alone in my ignorance of understanding or comprehension. Numbers that large only confuse and distort the mind if pondered. I much prefer to think intelligently about smaller numbers that I can relate to. For example, the price of gas, my mortgage payment, or the fact that there are always less than 365 days until next Christmas, my birthday, or the next election.

Astronomy Delight! Headquartered in Hyde Park, N.Y. welcomes your questions and comments regarding this column and offers day and night after-school enrichment programs, classroom events, scouts, camps, group lectures, individual astronomy programs, and observation courses for families, parents, and children of all ages throughout the country and Tri-state NY area. FRANCHISE INQUIRIES

ARE WELCOME

(845) 229-4434

www.Astronomydelight.com

In Challenging Economic Times Fewer and Fewer People Are

**Playing Golf Or Skiing
Renewing Country Club Memberships
Visiting Camps, Vacation Resorts, Nature Centers, And Spas**

BUT...

LAST YEAR MILLIONS OF FAMILIES, INDIVIDUALS, AND PEOPLE OF ALL AGES DEVELOPED A LIFE-LONG INTEREST IN THE CAPTIVATING AND RELAXING SCIENCE OF ASTRONOMY!

If you are an upscale, visionary, facility, with an eye to the future, who desires to attract more clientele to reverse the progressive decline of the recreation industry, then

ACT NOW! JOIN THE LUCRATIVE RECREATION + EDUCATION INDUSTRY!

- Professionally Equipped, Guest-Friendly, Indoor - Outdoor Observatories And Planetariums - 8' - 50' Domes
- Invest In Vast New Environment and Education Directed Growth Markets
- Unique, Fun, Inspiring, Wholesome and Green, Day and Night All Season Indoor and Outdoor Programs Designed To Increase Revenue and Fill Vacancies Year Round!

Astronomy Delight! 

Contact: Susan Forrest, President
Telephone: 845-229-5572

Astronomydelight@aol.com
www.astronomydelight.com